

What is claimed is:

1. An apparatus for automatically turning a page of a book, comprising:
a casing (10) on which a music book (5) can be placed in an opened state;
5 a page holding means (40) which is installed within the casing (10) and holds a page (6) of the opened music book (5) to be turned and a turned page (7) thereof;
a page turning means (50) which is installed within the casing (10) to turn a page of the opened music book;
a driving means (60) for driving the page holding means (40) and the page turning
10 means (50);
a manipulation means (110) for manipulating operations of the driving means (60);
and
a control unit (130) for controlling the operations of the driving means (60) for turning a relevant page of the music book (5) placed on the casing (10), in response to
15 signals from the manipulation portion (110).
2. The apparatus as claimed in claim 1, wherein the page holding means (40) comprises a first holder (42) and a second holder (43) which are installed within the casing (10) to come out from or get in the casing (10) through first and second holder apertures
20 (12, 13) formed in a top surface of the casing (10) on both lateral sides of a central portion (8) of the music book (5) and hold the page (6) to be turned and the turned page (7), respectively.
3. The apparatus as claimed in claim 1, wherein the page turning means (50)
25 comprises an actuating lever (55) which is installed within the casing (10) to come out from or get in the casing (10) through a lever slit (15) formed in a top surface of the casing (10) along the width of the page (6) to be turned from a central portion (8) of the music book (5) and to pivot in a right and left direction on a pivoting shaft (65) adjacent to the central portion (8) of the music book (5) and has a contact member (55) coupled to a distal
30 end thereof to come into contact with the page (6) of the music book (5) to be turned.

4. The apparatus as claimed in claim 1, wherein the driving means (60) comprises:

a pivoting driving portion (61) for causing an actuating lever (55) to pivot so that the actuating lever (55) can come out from or get in the casing (10) through a lever slit (15) formed in a top surface of the casing (10) along the width of the page (6) to be turned from a central portion (8) of the music book (5), the actuating lever (55) being installed within the casing (10) to pivot in a right and left direction on a pivoting shaft (65) and having a contact member (55) coupled to a distal end thereof to come into contact with the page (6) of the music book (5) to be turned;

a first holder driving portion (81) for causing a first holder (42) to come into contact with or to be separated from the page (6) to be turned, the first holder (42) coming out from and getting in the casing (10) through a first holder aperture (12) of first and second apertures (12, 13) formed in a top surface of the casing (10) on both lateral sides of a central portion (8) of the music book (5); and

a second holder driving portion (101) for causing a second holder (43) to come into contact with or to be separated from the turned page (7), the second holder (43) coming out from and getting in the casing (10) through the second holder aperture (13).

5. The apparatus as claimed in claim 4, wherein the pivoting driving portion (61) comprises:

a pivoting shaft unit (62) installed at a central portion of the interior of the casing (10) perpendicularly to the length of the actuating lever (55) to cause the actuating lever (55) to pivot in the right and left direction;

a lever driving motor (71) which can rotate in a forward or reverse direction and is disposed adjacent and parallel to the pivoting shaft unit (62); and

a power reduction gear unit (73) which is interposed between the lever driving motor (71) and the pivoting shaft unit (62) to reduce the rotation of the lever driving motor (71) and to transmit the reduced rotation to the pivoting shaft unit (62).

6. The apparatus as claimed in claim 5, wherein the pivoting shaft unit (62)

comprises:

a bracket (63) formed with shaft holes (64) at opposite sides thereof with the actuating lever (55) interposed therebetween;

5 a pivoting shaft (65) of which both ends are rotatably fitted into the shaft holes (64) of the bracket (63) and through which an end of the actuating lever (55) penetrates to be pivotably coupled thereto; and

a guider (68) which is connected via gears to the power reduction gear unit (73) to rotate about the pivoting shaft (65) and has a guide slot (69) formed to make an acute angle with respect to an axis of the pivoting shaft (65), the actuating lever (55) penetrating
10 though the guide slot (69).

7. The apparatus as claimed in claim 5 or 6, wherein the pivoting driving portion (61) further comprises first and second micro switches (75, 76) provided on opposites sides with respect to the pivoting shaft unit (62) so that the actuating lever (55) can selectively
15 come into contact with the switches upon pivoting of the actuating lever (55), thereby controlling the operation of the lever driving motor (71).

8. The apparatus as claimed in claim 5 or 6, wherein the pivoting driving portion (61) further comprises a leaf spring (79) which is installed between the pivoting shaft unit (62)
20 and the lever driving motor (71) to guide the actuating lever (55) in an aft direction along an axis of the pivoting shaft (65) upon pivoting of the actuating lever (55) in the right and left direction.

9. The apparatus as claimed in claim 4, wherein the first holder driving portion (81)
25 comprises:

a pivoting shaft (82) which is installed longitudinally within the casing (10) to cause the first holder (42) secured perpendicularly thereto to come out from or get in the casing (10) through the first holder aperture (12); and

a holder driving motor (85) for rotating the pivoting shaft (82) in a forward or
30 reverse direction.

10. The apparatus as claimed in claim 9, wherein the pivoting shaft (82) comprises:

a first holder shaft (83) to which the first holder (42) is secured;

a driving shaft (84) coupled to the holder driving motor (85); and

5 a torsion spring (86) for connecting the first holder shaft (83) to the driving shaft (84).

11. The apparatus as claimed in claim 10, wherein the pivoting shaft (82) further comprises:

10 a holder cam (87) and a shaft cam (88) which are installed on the first holder shaft (83) and the driving shaft (84), respectively, to rotate integrally therewith, and have mutually opposite cam profiles; and

third and fourth micro switches (77, 78) which are installed within the radii of the cam profiles of the holder cam (87) and the shaft cam (88), respectively, so that the holder
15 cam (87) and the shaft cam (88) selectively come into contact with the switches (77, 78), thereby controlling the rotation of the holder driving motor (85) in the forward or reverse direction.

12. The apparatus as claimed in claim 4, wherein the second holder driving portion
20 (101) comprises:

a second holder shaft (102) for causing the second holder (43) to come out from or to get in the casing (10) through the second holder aperture (12) of the casing (10);

a spring (105) installed perpendicular to the second holder shaft (102) to elastically urge the second holder shaft (102) so that the second holder shaft (102) can pivot in a
25 direction in which the second holder (43) comes out from the casing through the second holder aperture (12); and

an interlocking operation bar (107) attached to an end of the first holder shaft (83) so that the second holder (43) which has come out from the casing (10) through the second holder aperture (13) can get back in the casing (10) while being interlocked with the first
30 holder (42).

13. The apparatus as claimed in claim 4, wherein the second holder driving portion (101) comprises:

5 a second holder shaft (102) for causing the second holder (43) to pivot such that the second holder (43) can come out from or to get in the casing (10) through the second holder aperture (13) formed perpendicularly to the first holder aperture (12) in the top surface of the casing (10); and

10 bevel gears (142, 143) which are installed on a first holder shaft (83) of the first holder driving portion (81) and on an end of a second holder shaft (102') provided perpendicularly to the first holder shaft (83), respectively, to transmit rotational force of the first holder shaft (83) to the second holder shaft (102').

14. The apparatus as claimed in claim 1, wherein the casing (10) further comprises an actuation switch (144) and a fifth micro switch (145) for controlling the operations of the driving means (60) by sensing whether the music book (5) is placed on the top surface of the casing (10).

15. The apparatus as claimed in claim 1, wherein a cover (30) is pivotably installed on the casing (10) to cause the top surface of the casing (10) to be covered or exposed to the outside, and an inner surface of the cover (30) is provided with a cover holder (31) for partially holding the page (6) to be turned and a cover boss (32) protruding from a portion of the inner surface of the cover (30) adjacent to the cover holder (31) so that the page (6) to be turned can curvedly bulge in a fore direction.

25 16. The apparatus as claimed in claim 1 or 15, wherein the casing (10) is provided with an external power supply unit (121), and an internal power supply unit (123) that can be selectively used and accommodate a rechargeable battery.

17. The apparatus as claimed in claim 1, wherein the manipulation portion (110) further comprises:

an RF signal generator (115) mounted on a foot switch (118); and
an RF signal sensor (117) for sensing RF signals from the RF signal generator (115) and transmitting the sensing results to the control unit (130).